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Dates of Tests: Mar 14~25, 2011
 Test Report S/N: LR500111104K
 Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID.
 IC
 APPLICANT

U7XMC-7100S
7670A-MC7100S
M3 Mobile Co., Ltd

Equipment Class	:	Part 15 Spread Spectrum Transmitter (DSS)
Manufacturing Description	:	Industrial PDA
Manufacturer	:	M3 Mobile Co.,Ltd.
Model name	:	MC-7100S
Variant Model name	:	M3 SKY
Test Device Serial No.:	:	Identical prototype
Rule Part(s)	:	FCC Part 15.247 Subpart C; ANSI C-63.4-2003 RSS-210 and ISSUE No.: 8 Date: 2010
Frequency Range	:	2402 ~ 2480MHz
RF power	:	Maximum -0.09dBm - Conducted
Data of issue	:	Apr 29, 2011

This test report is issued under the authority of:

The test was supervised by:

Hyun-Chae You, Manager

Il-Shin kim, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



NVLAP LAB Code.: 200723-0

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1. General information's

1-1 Test Performed

Company name : LTA Co., Ltd.
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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2011-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2011-09-01	EMC accredited Lab.
FCC	U.S.A	610755	UPDATING	FCC filing
FCC	U.S.A	649054	2011-05-26	FCC CAB
VCCI	JAPAN	R2133(10m), C2307	2011-06-21	VCCI registration
VCCI	JAPAN	T-2009	2013-12-23	VCCI registration
IC	CANADA	IC5799	2012-05-14	IC filing

2. Information's about test item

2-1 Applicant & Manufacturer

Company name : M3 Mobile Co.,Ltd.
 Address : M3 B/D, 735-45, Yeoksam-dong, Gangnam-gu, Seoul, Korea
 Tel / Fax : +82-2-2022-1312 / +82-2-556-9730

2-2 Equipment Under Test (EUT)

Trade name : Industial PDA
 FCC ID : U7XMC-7100S
 Model name : MC-7100S
 Variant Model name ; M3 SKY
 Serial number : Identical prototype
 Date of receipt : Mar 11, 2011
 EUT condition : Pre-production, not damaged
 Antenna type : chip antenna with Max. -1.6 dBi gain
 Frequency Range : 2402 ~ 2480MHz
 RF output power : Maximum -0.09dBm - Conducted
 Number of channels : 79
 Duty Cycle : 80%
 Channel spacing : 1MHz
 Channel Access Protocol : Frequency Hopping
 Type of Modulation : GFSK
 Power Source for Batt. : Battery Pack: 3.7V (Li-ion Rechargeable battery)
 Power Source for Adapter. : Input: 100-240VAC, 0.5A Output: 5.2VDC 3A
 Firmware Version : MBoot V4.1.0

2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz)	2402	2441	2480

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
PC(EMI1)	HP Compaq dx7400 Microtower	CNG8330J95	HP
Monitor 17"	HPL1710	CNC816QH92	HP
Keyboard	SK-8115	641-OEWW	DELL
Mouse	MO56UO	LNB33130022	DELL
PRINTER	STYLUS C65	FXSY002205	EPSON

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	Carrier Frequency Separation	> 25 kHz	Conducted	C
15.247(a)	Number of Hopping Frequencies	> 15 hops		C
15.247(a)	20 dB Bandwidth 99% Bandwidth	> 1.5 MHz		C
15.247	Dwell Time	< 0.4 seconds		C
15.247(b)	Transmitter Output Power	< 250 mWatt		C
15.247(d)	Conducted Spurious emission	> 20 dBc		C
15.247(d)	Band Edge	> 20 dBc		C
15.249 / 15.209	Field Strength of Harmonics	< 54 dBuV (at 3m)	Radiated	C
15.109	Field Strength	-		C
15.207 /15.107	AC Conducted Emissions	EN 55022	Line Conducted	C
15.203	Antenna requirement	-	-	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

→ Antenna Requirement

The M3 Mobile Co.,Ltd. FCC ID: U7XMC-7100S unit complies with the requirement of §15.203.
The antenna is Chip antenna.

The sample was tested according to the following specification:
FCC Parts 15.247; ANSI C-63.4-2003
RSS-210 and ISSUE No.: 8 Date: 2010

3.2 Transmitter requirements

3.2.1 Carrier Frequency Separation

Procedure:

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

After the trace being stable, the reading value between the peaks of the adjacent channels using the marker-delta function was recorded as the measurement results.

The spectrum analyzer is set to:

Span = 3 MHz (wide enough to capture the peaks of two adjacent channels)

RBW = 10 kHz

Sweep = auto

VBW = 10 kHz

Detector function = peak

Trace = max hold

Measurement Data:

Test Results	
Carrier Frequency Separation (MHz)	Result
0.9986	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

The EUT shall have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of 20dB bandwidth of the hopping channel, whichever is greater.

Measurement Setup

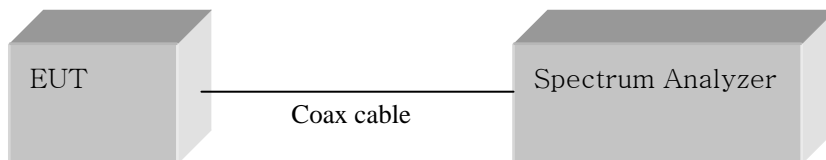
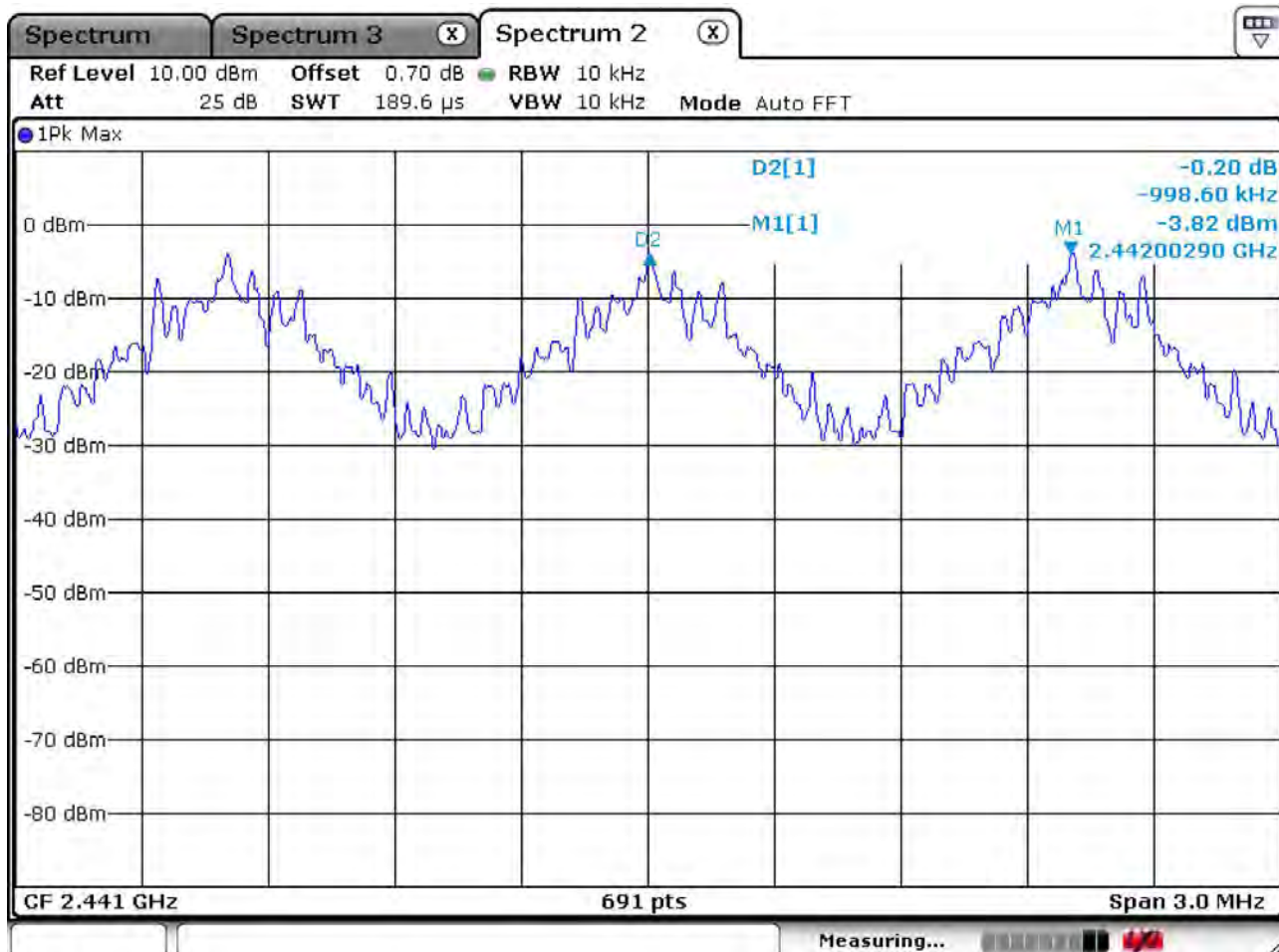
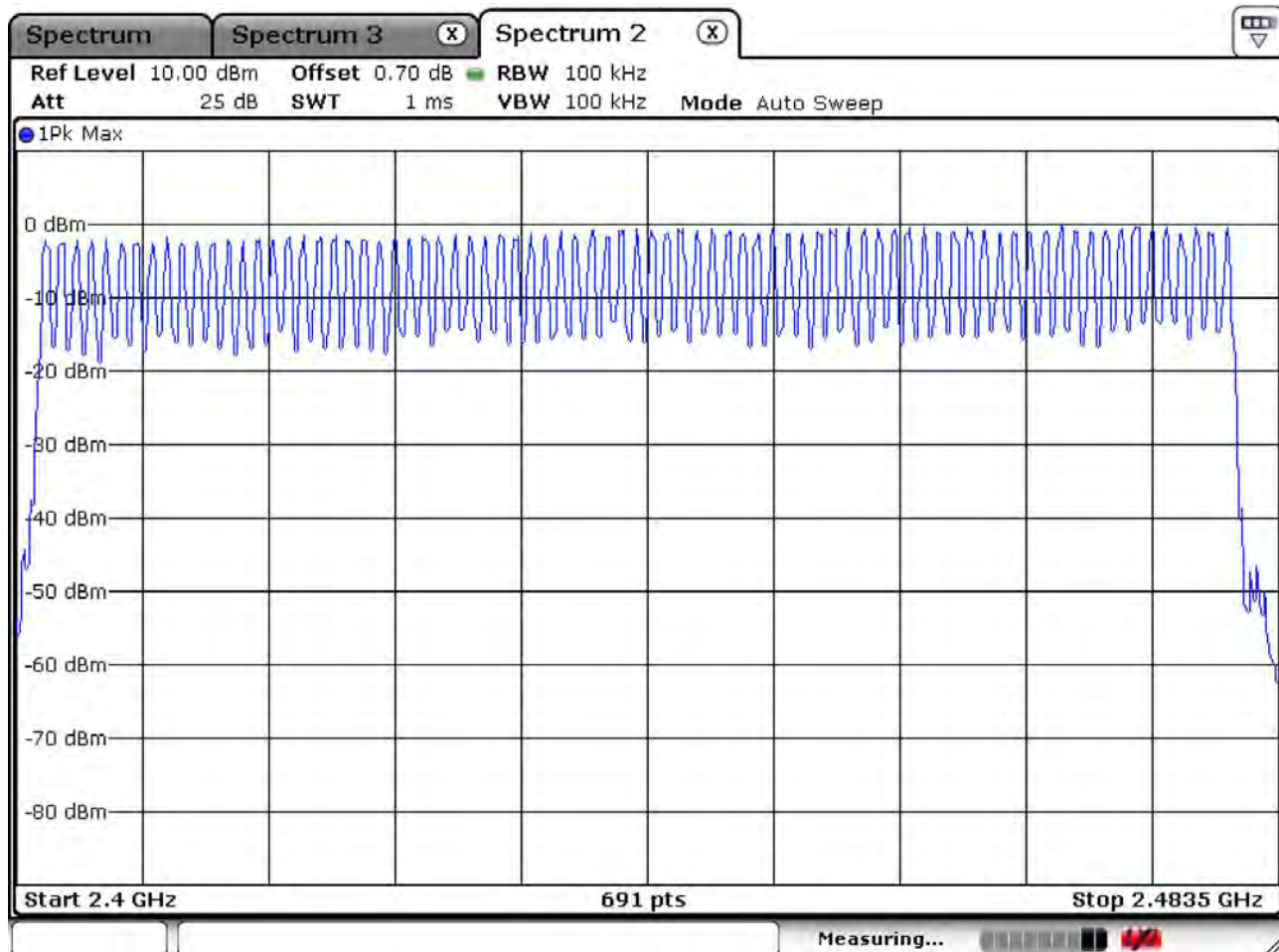


Figure 1: Measurement setup for the carrier frequency separation

Carrier Frequency Separation



Number of Hopping Frequencies



3.2.3 20 dB Bandwidth

Procedure:

The bandwidth at 20 dB below the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels..

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

Span = 3 MHz (approximately 2 or 3 times of the 20 dB bandwidth)

RBW = 30 kHz

Sweep = auto

VBW = 30 kHz (VBW \geq RBW)

Detector function = peak

Trace = max hold

dB/Div = 5dB

Measurement Data: Normal Mode

Frequency (MHz)	Channel No.	Test Results(MHz)	
		20dB Bandwidth	99% Bandwidth
2402	0	0.816	0.903
2441	39	0.816	0.886
2480	78	0.821	0.881

- See next pages for actual measured spectrum plots.

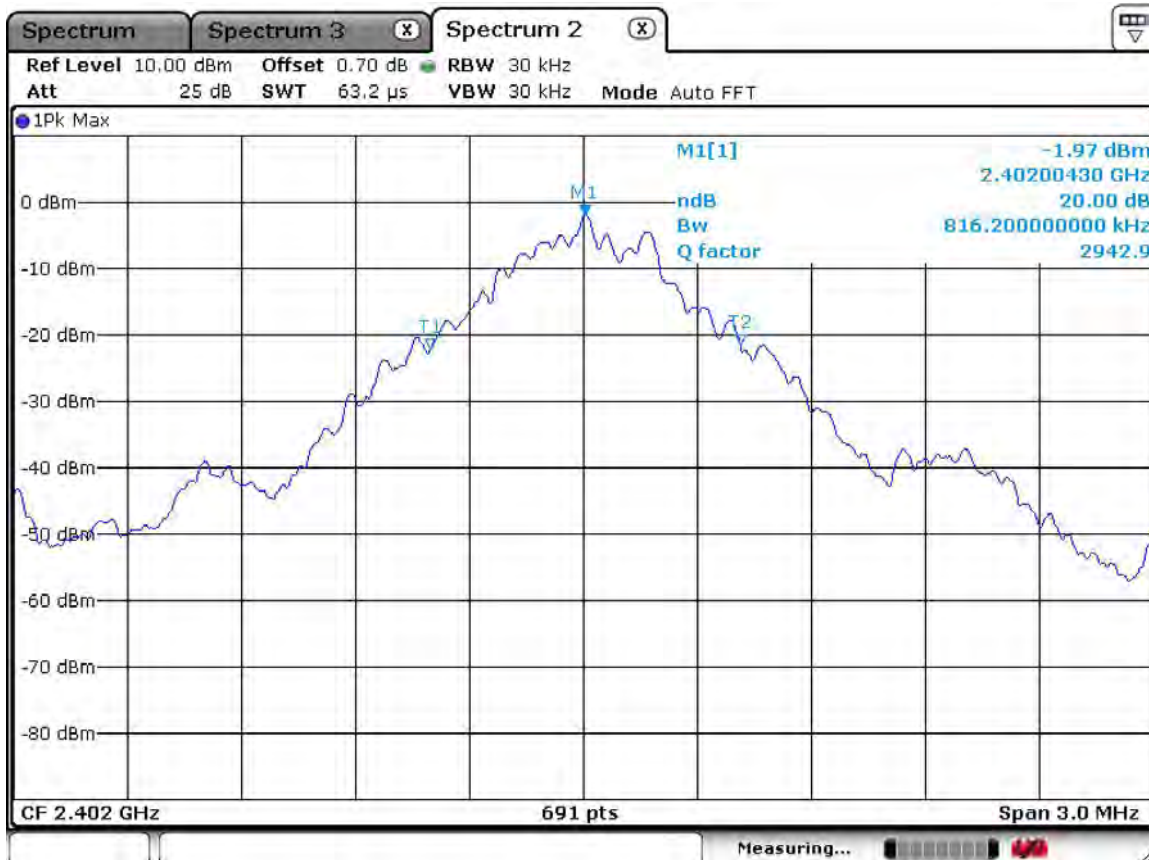
Minimum Standard:

N/A

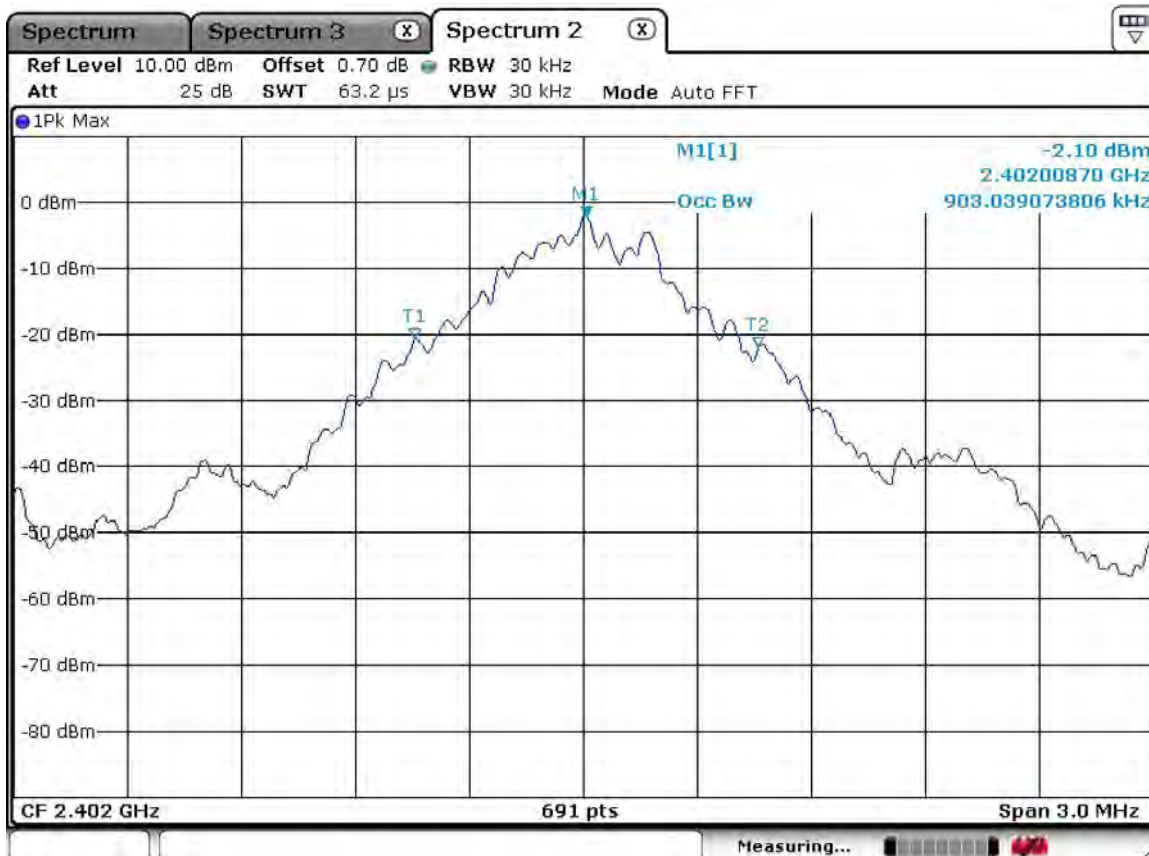
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

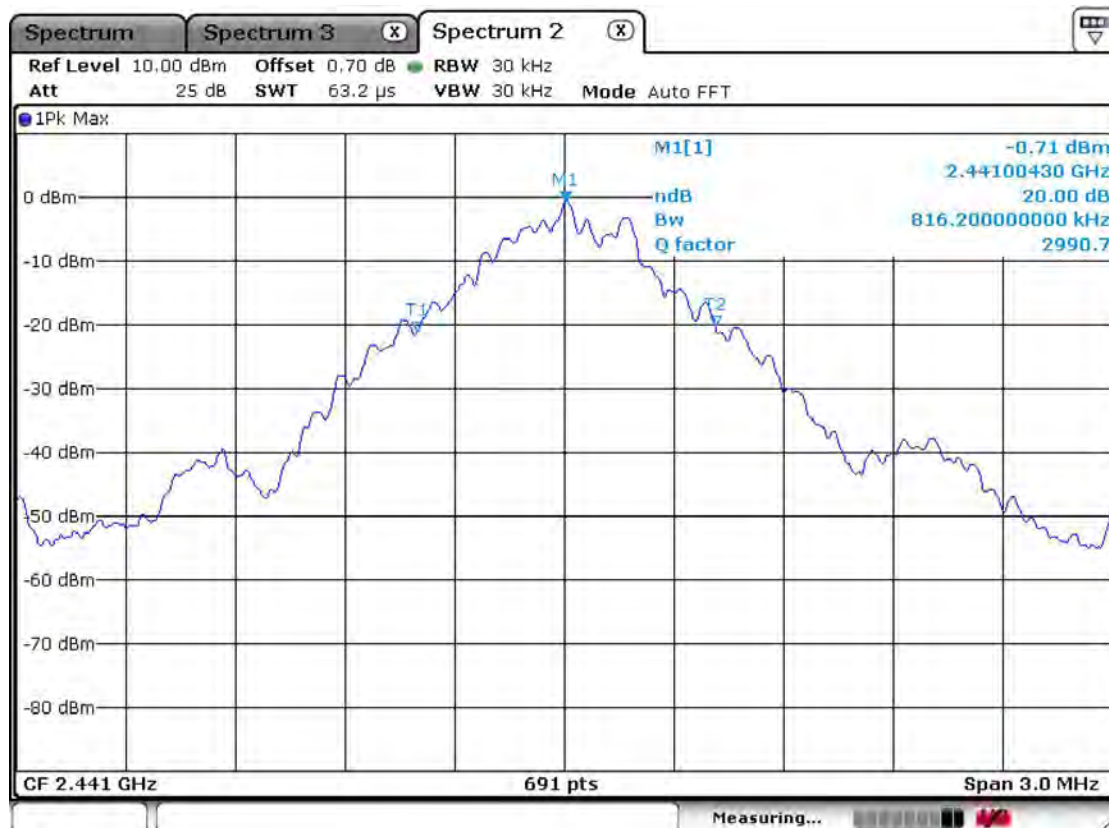
Low Channel
20 dB Bandwidth



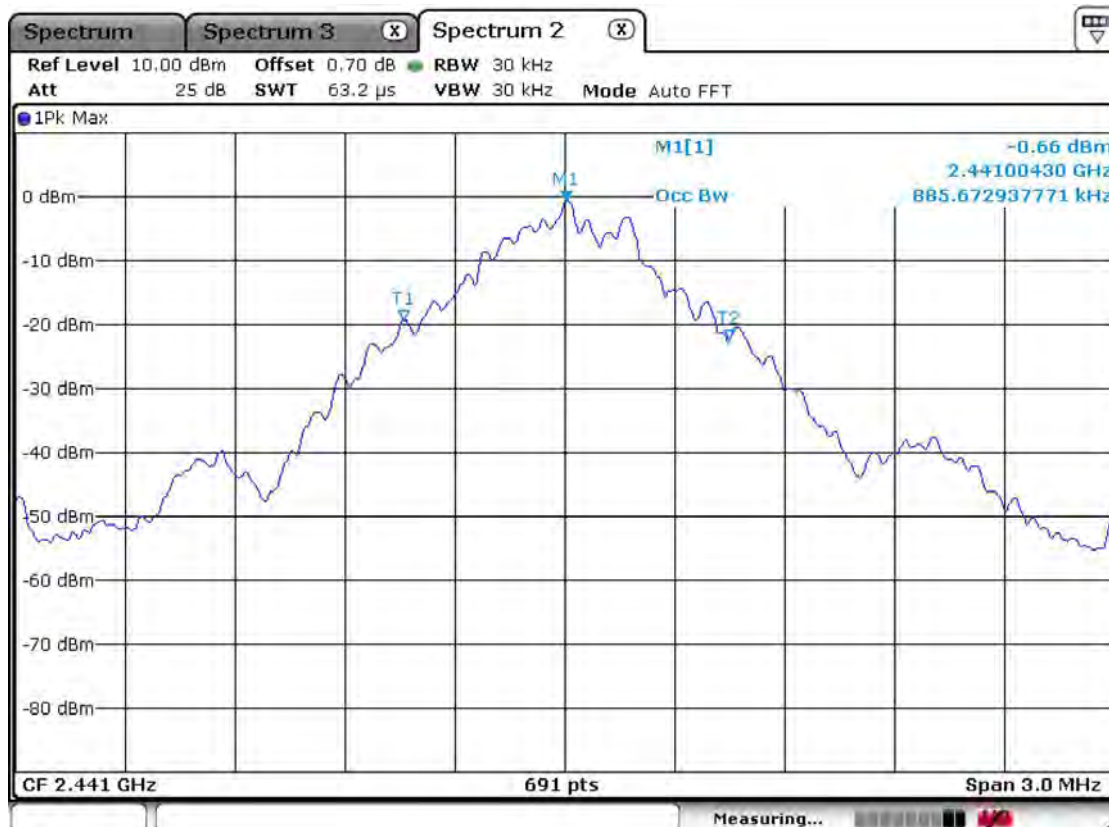
99% Bandwidth



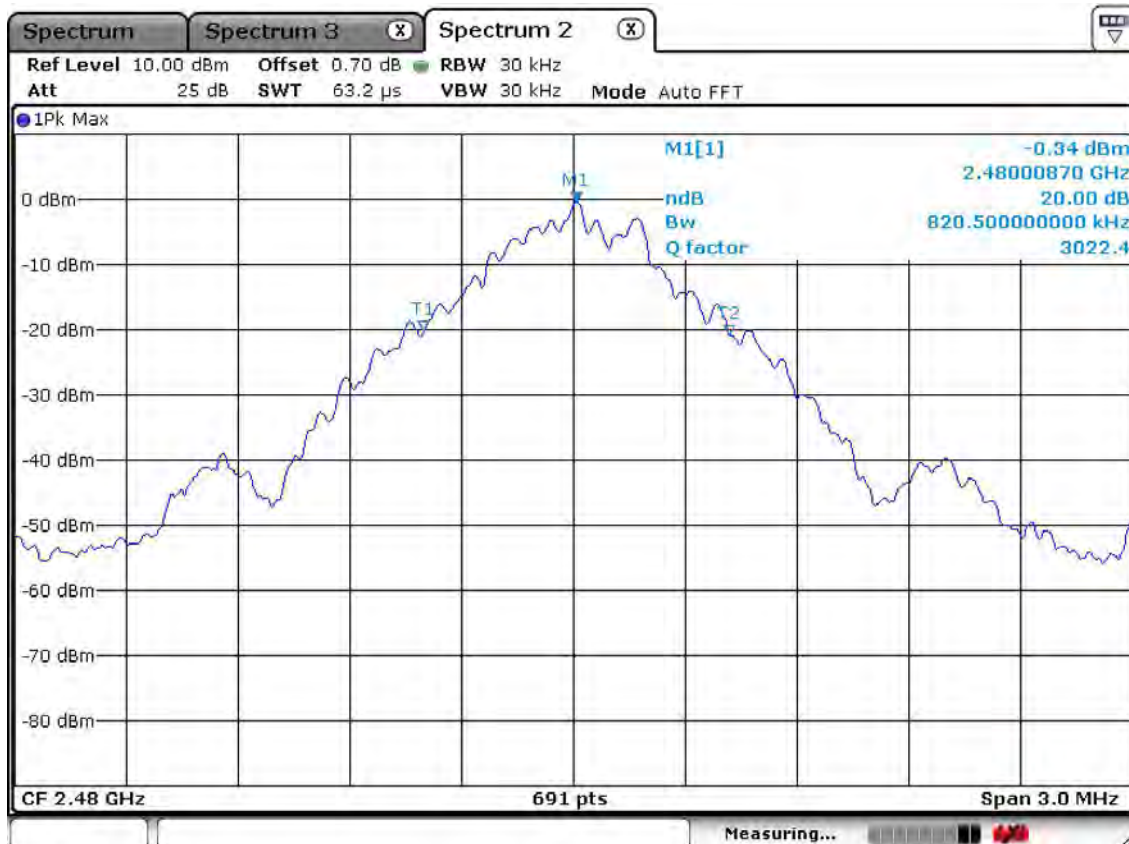
Mid Channel 20 dB Bandwidth



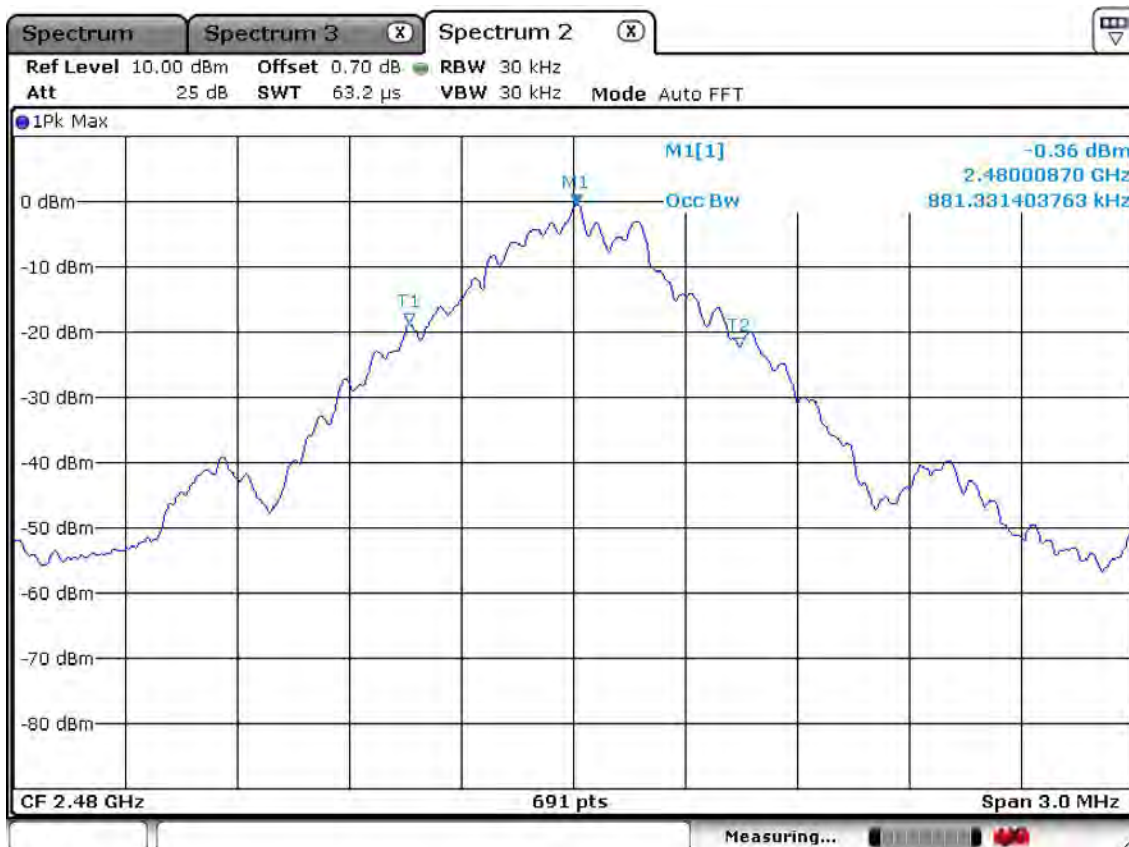
99% Bandwidth



High Channel 20 dB Bandwidth



99% Bandwidth



3.2.4 Time of Occupancy (Dwell Time)

Procedure:

The dwell time was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

The spectrum analyzer is set to:

Center frequency = 2441 MHz

Span = zero

RBW = 1 MHz

VBW = 1 MHz (VBW \geq RBW)

Trace = max hold

Detector function = peak

Measurement Data:

Mode	Number of transmission in a 31.6s (79Hopping*0.4)	Length of Transmission Time (msec)	Result (msec)	Limit (msec)
DH1	31(Times/3sec) *10.533= 326.52	0.561	183.18	400
DH3	15(Times/3sec) *10.533 = 158.00	1.790	282.82	400
DH5	10(Times/3sec) *10.533 = 105.33	3.084	324.84	400

- See next pages for actual measured spectrum plots.
- dwell time = {(number of hopping per second / number of slot) x duration time per channel} x 0.4 ms

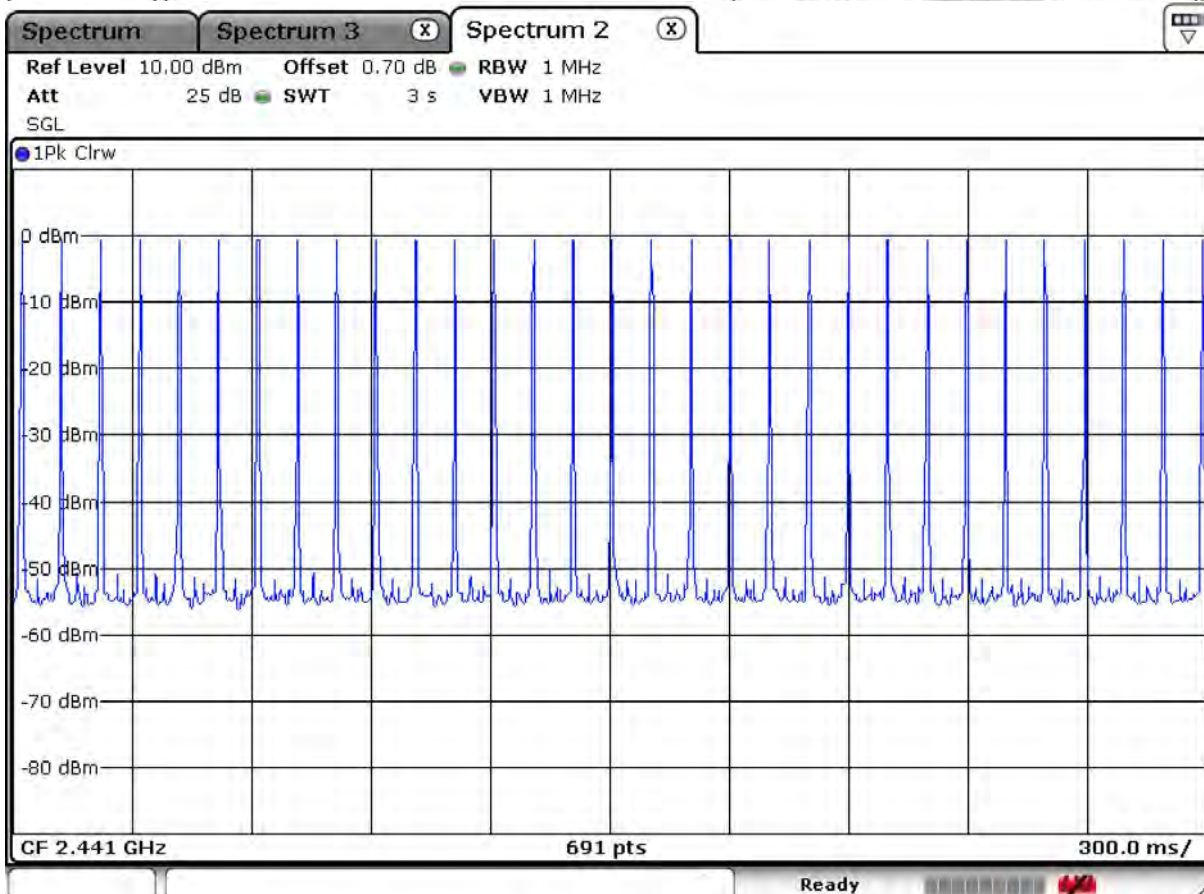
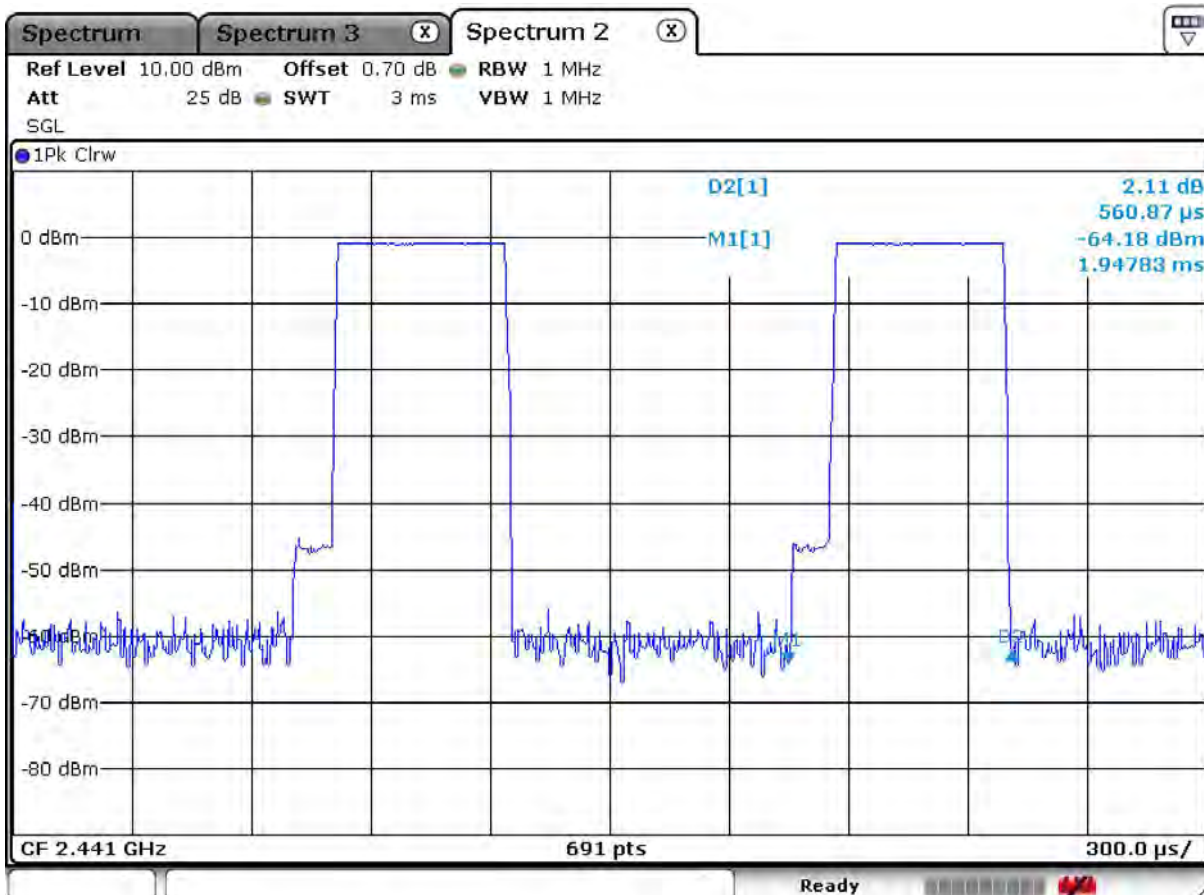
Minimum Standard:

0.4 seconds within a 30 second period per any frequency

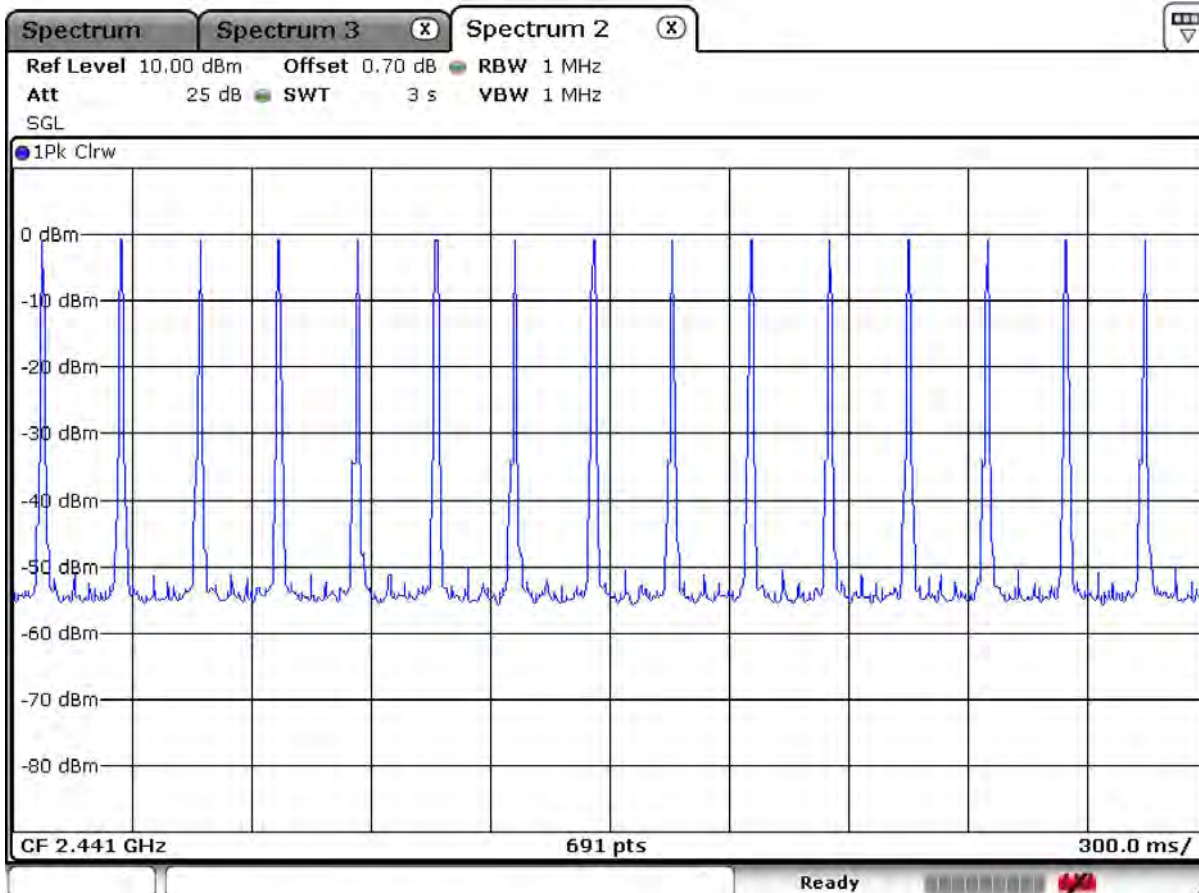
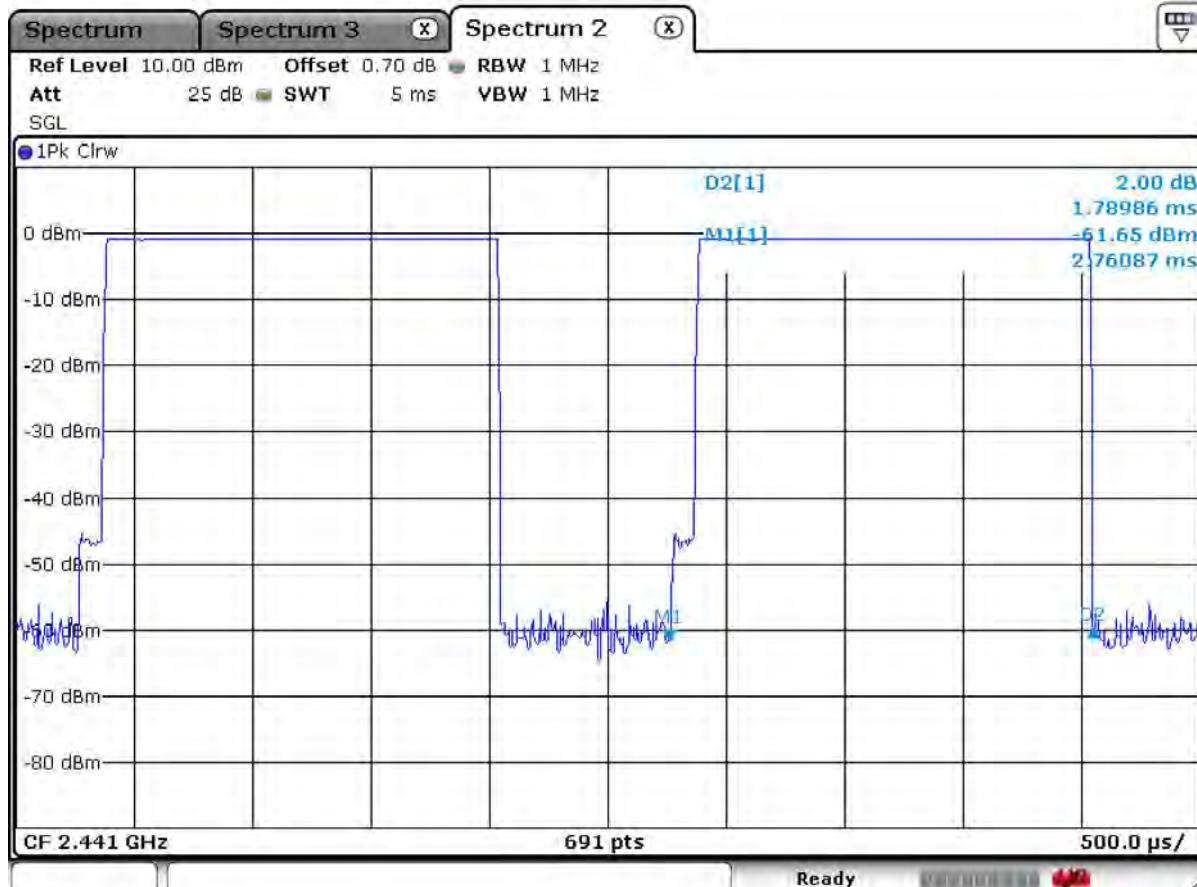
Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

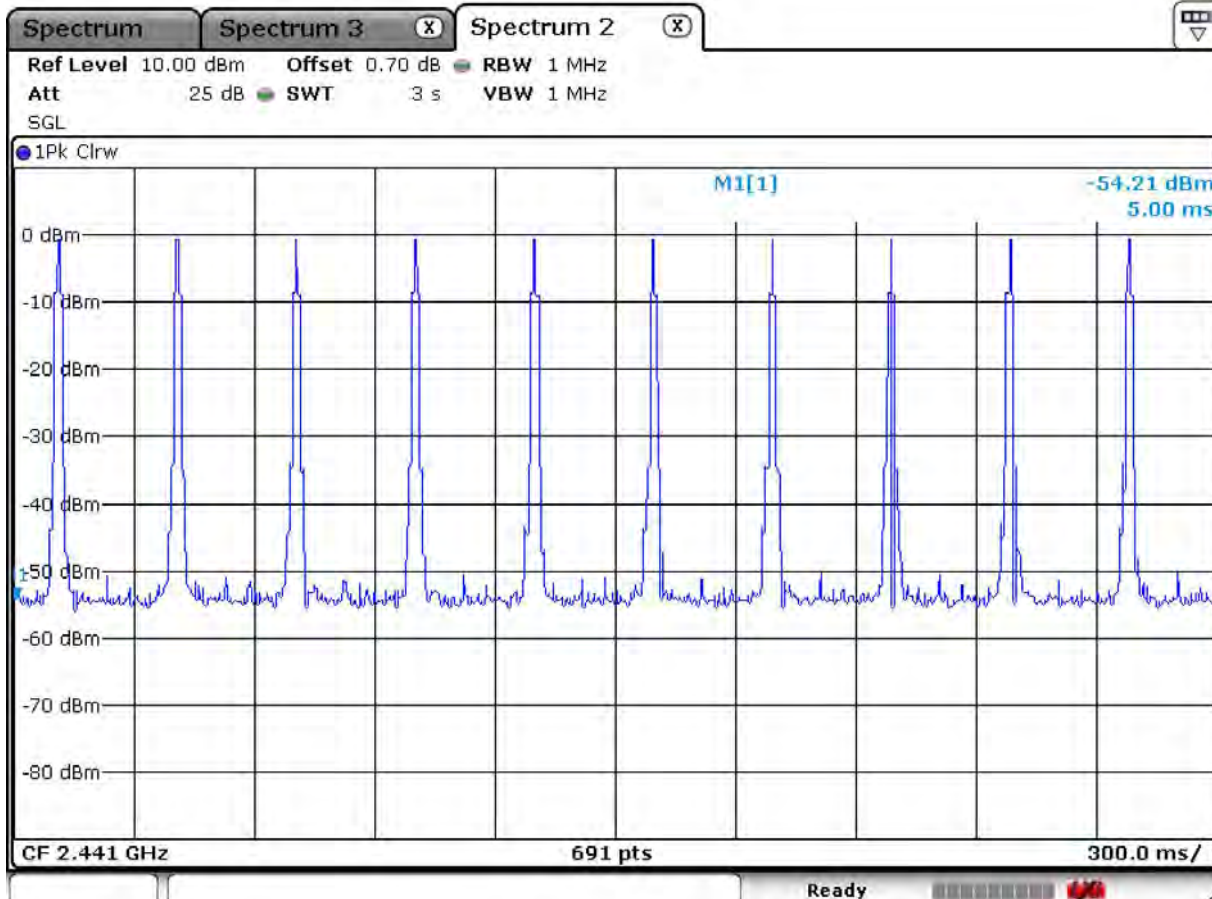
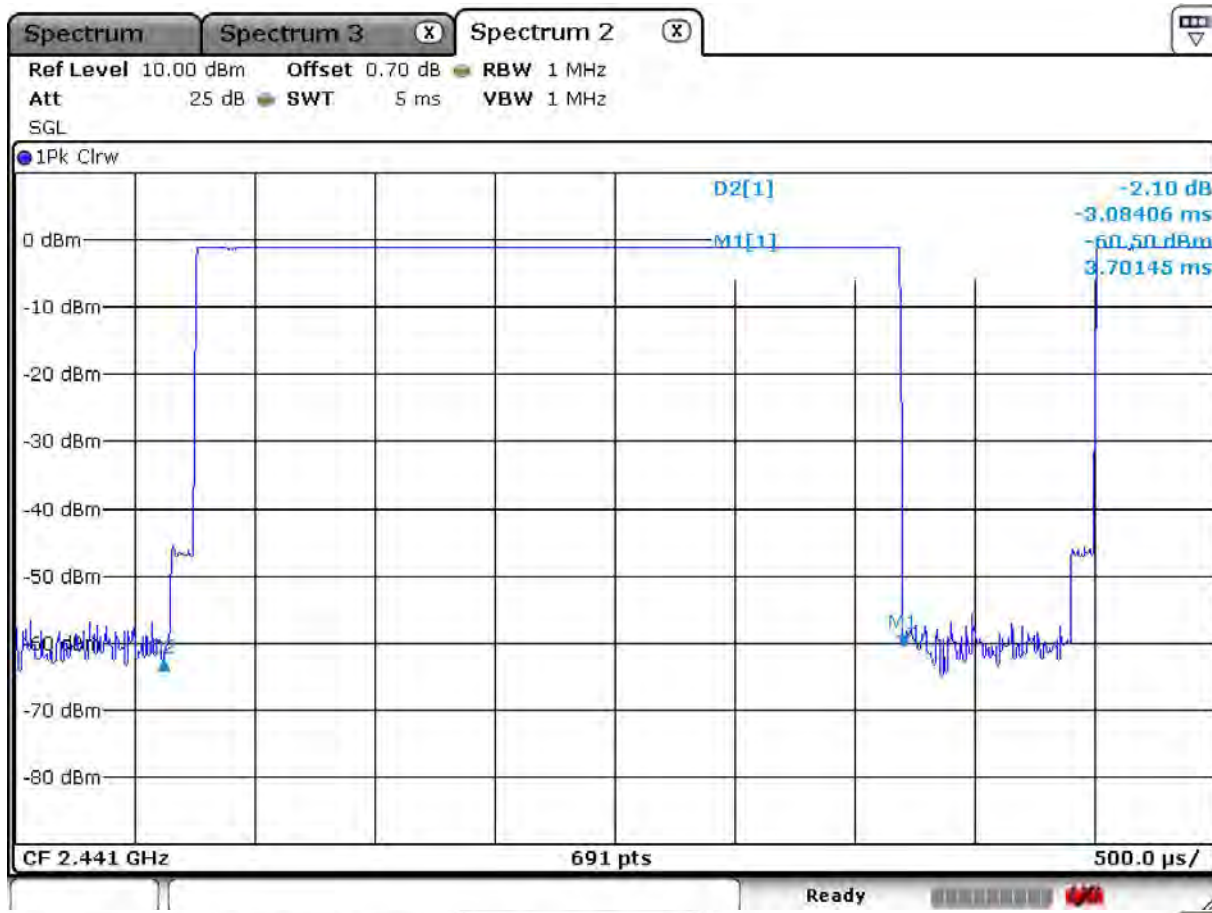
DH1 mode



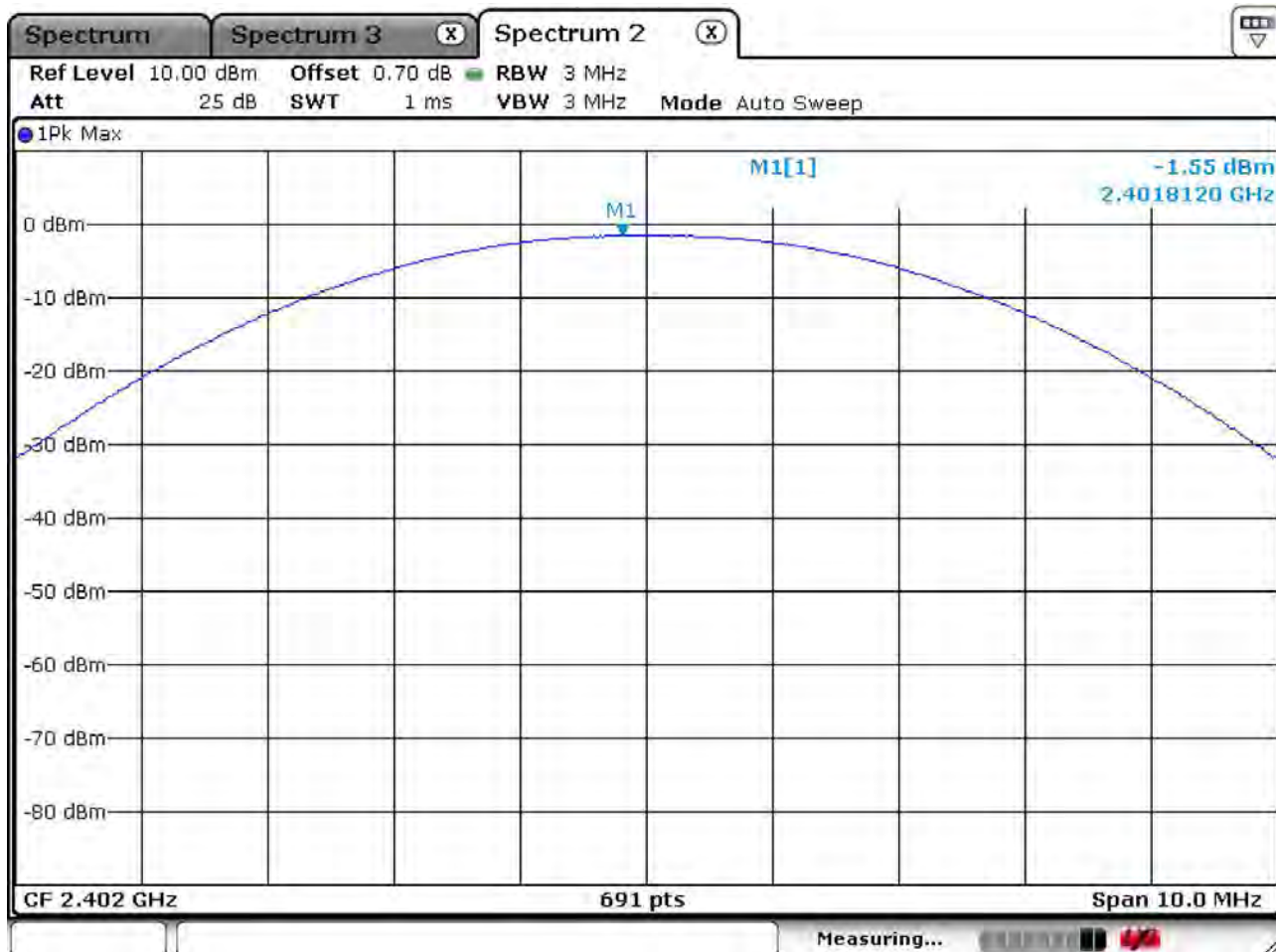
DH3 mode



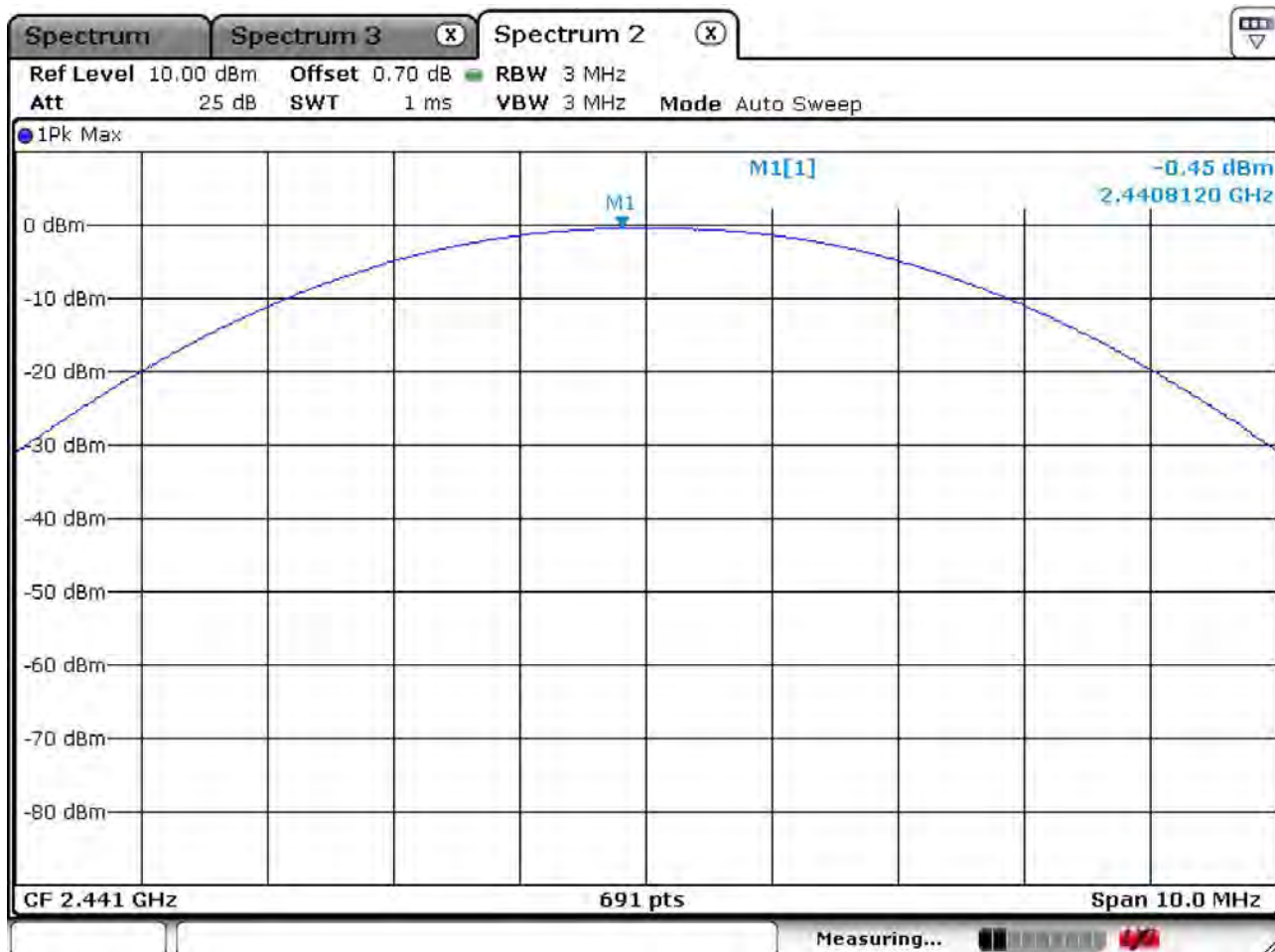
DH5 mode



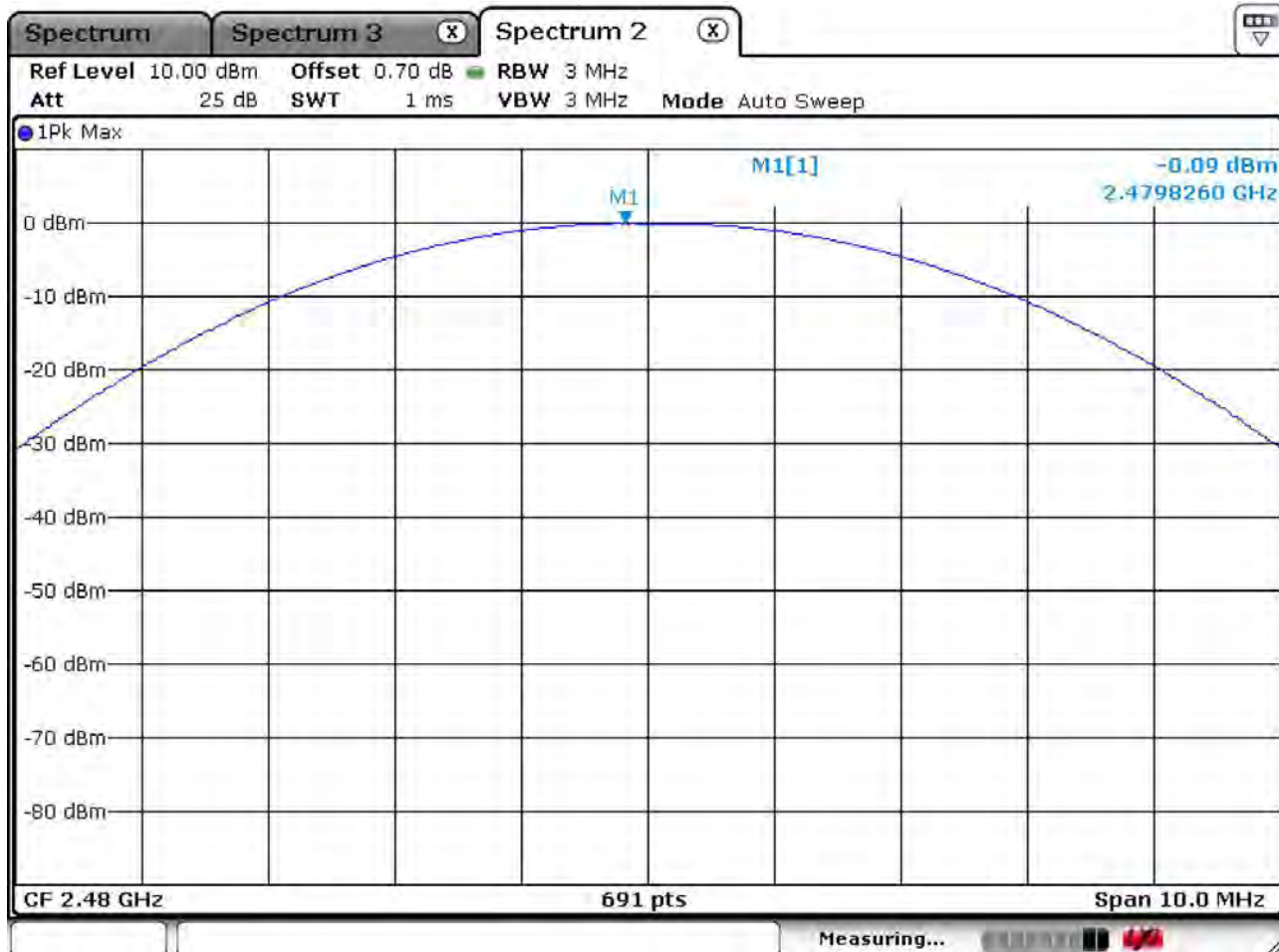
Low Channel



Mid Channel

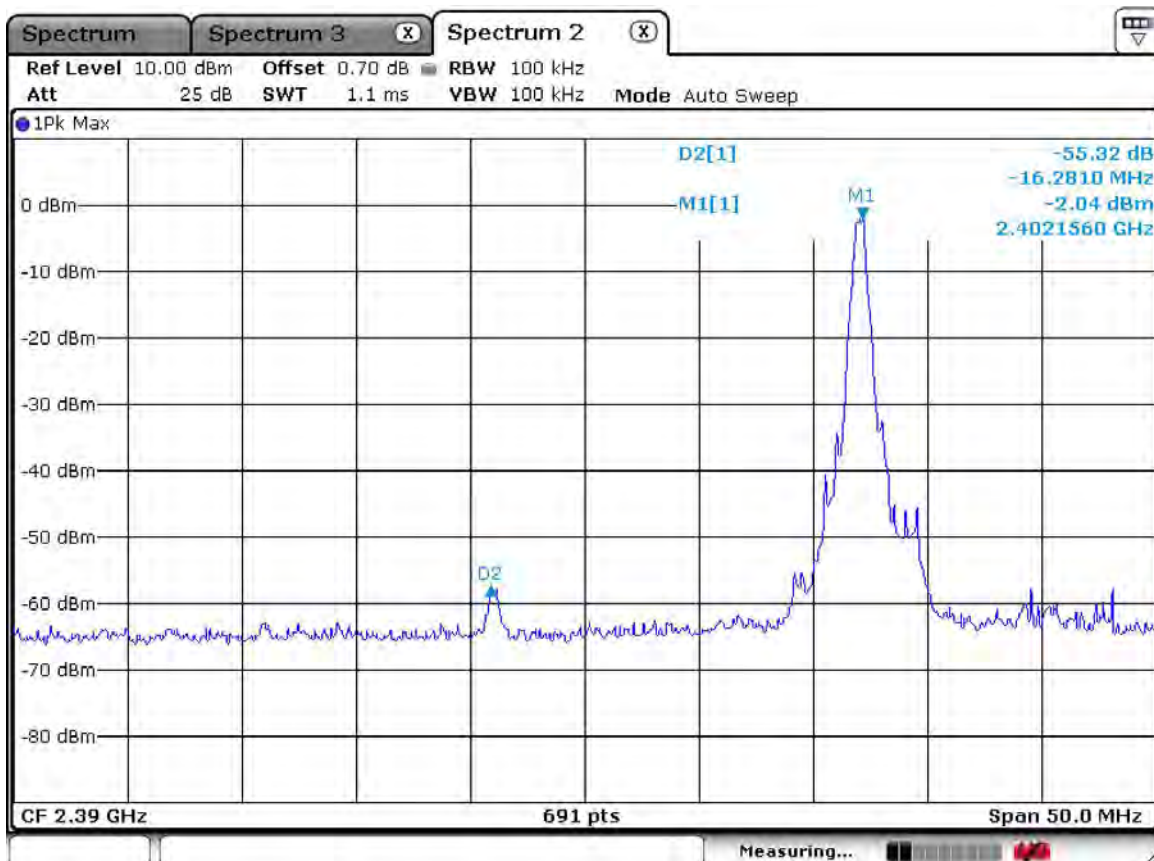


High Channel

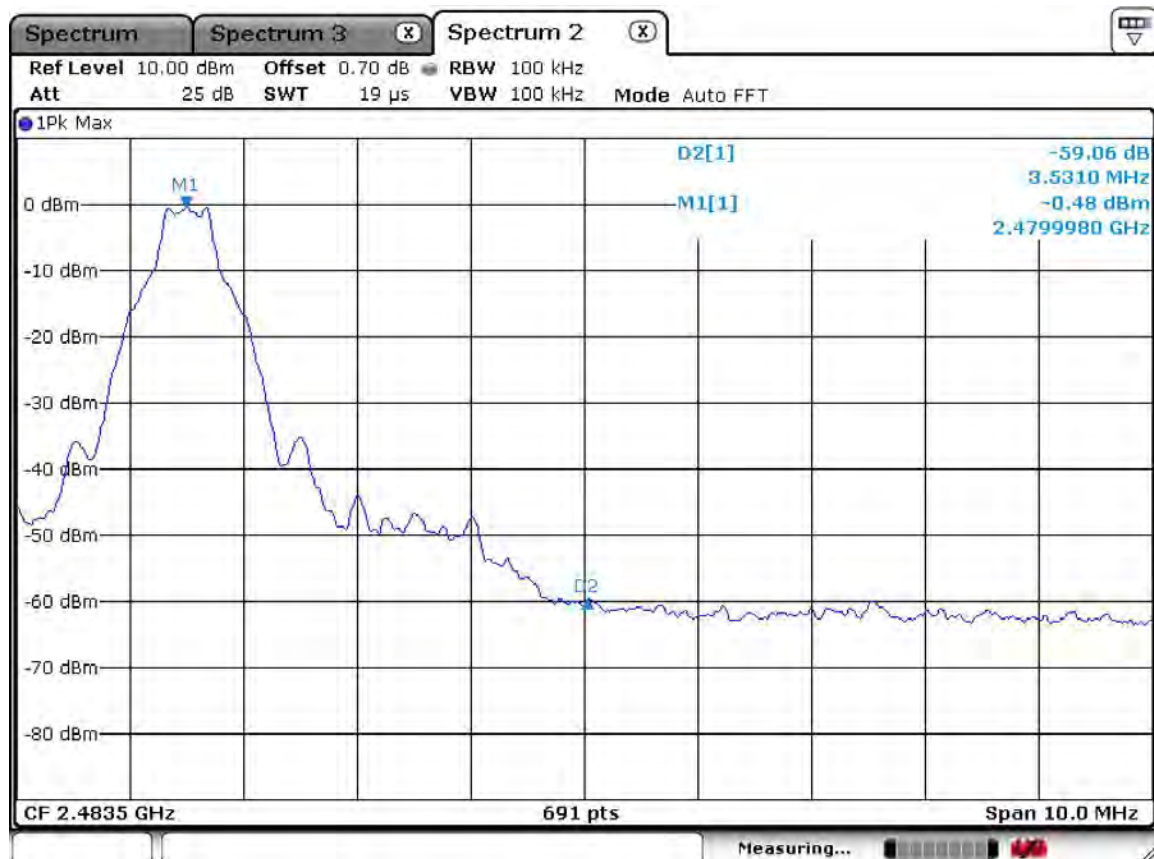


Band - edge

Lower edge



Upper edge



Band-edges in the restricted band 2310-2390 MHz measurement

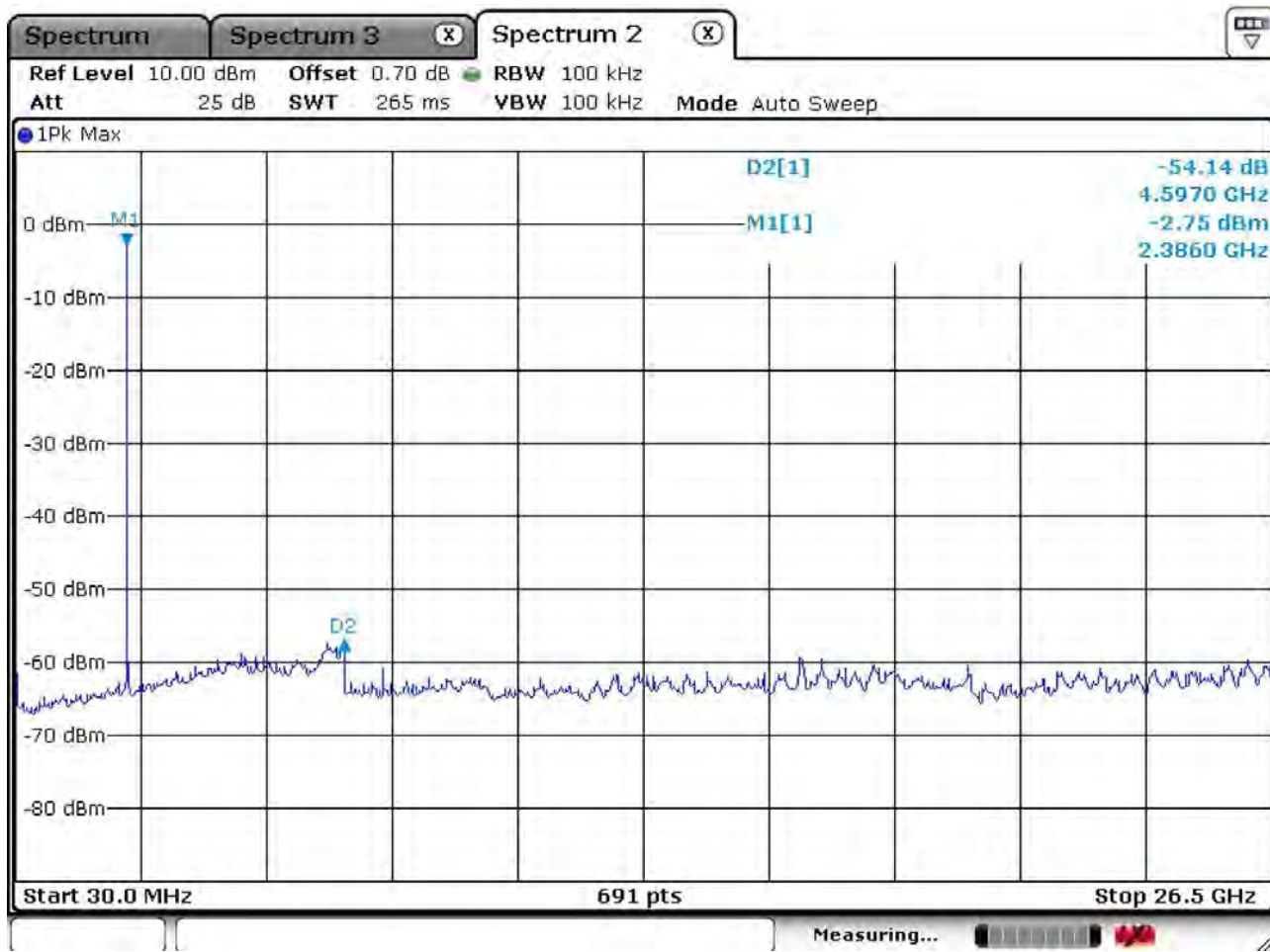
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor			Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2373	42.4	51.6	H	26.0	37.1	4.0	54.0	74.0	35.3	44.5	18.7	29.5

Band-edges in the restricted band 2483.5-2500 MHz measurement

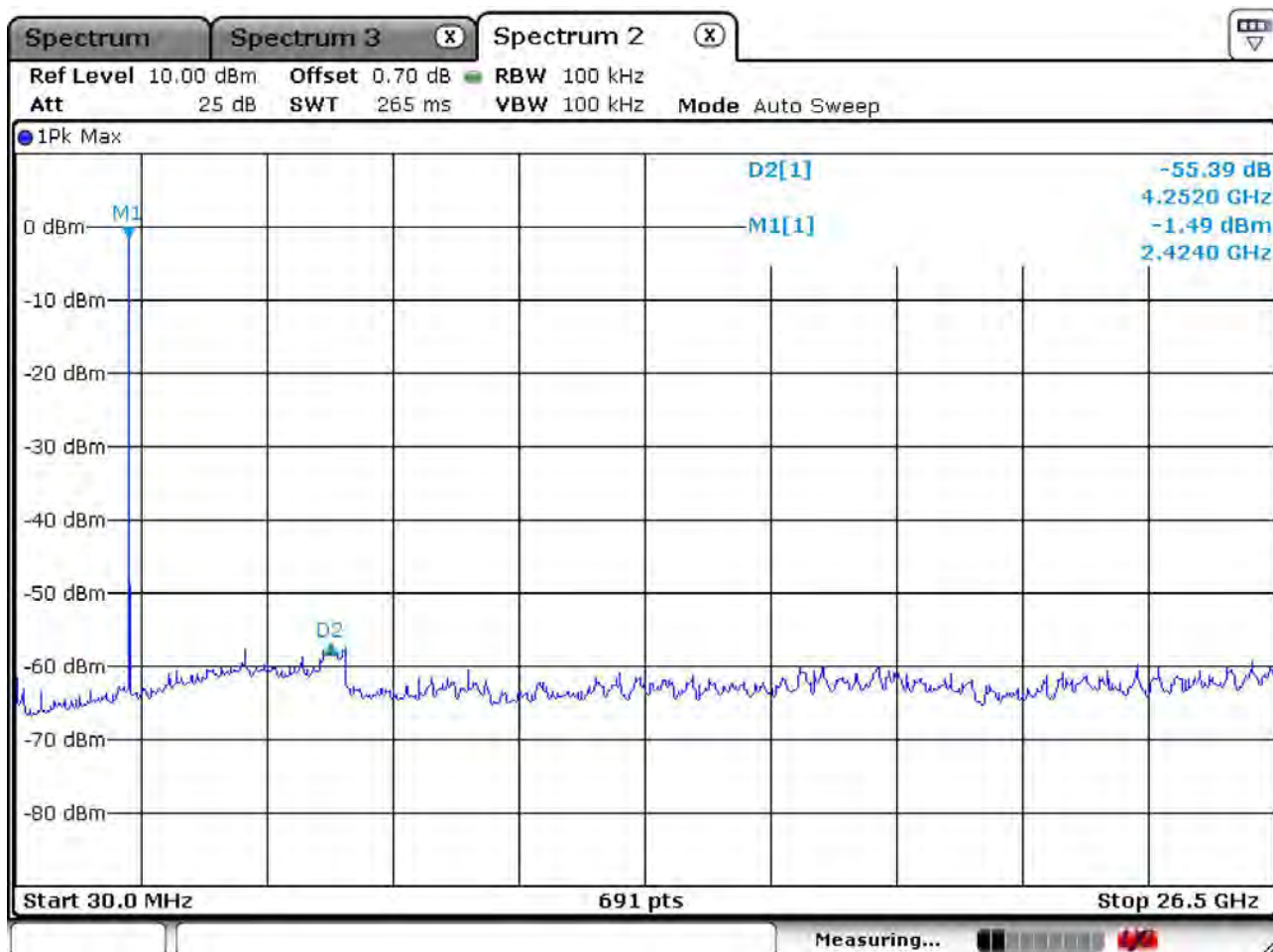
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor			Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
2483.5	38.0	51.1	H	26.0	37.1	4.0	54.0	74.0	30.9	44.0	23.1	30.0

Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented.

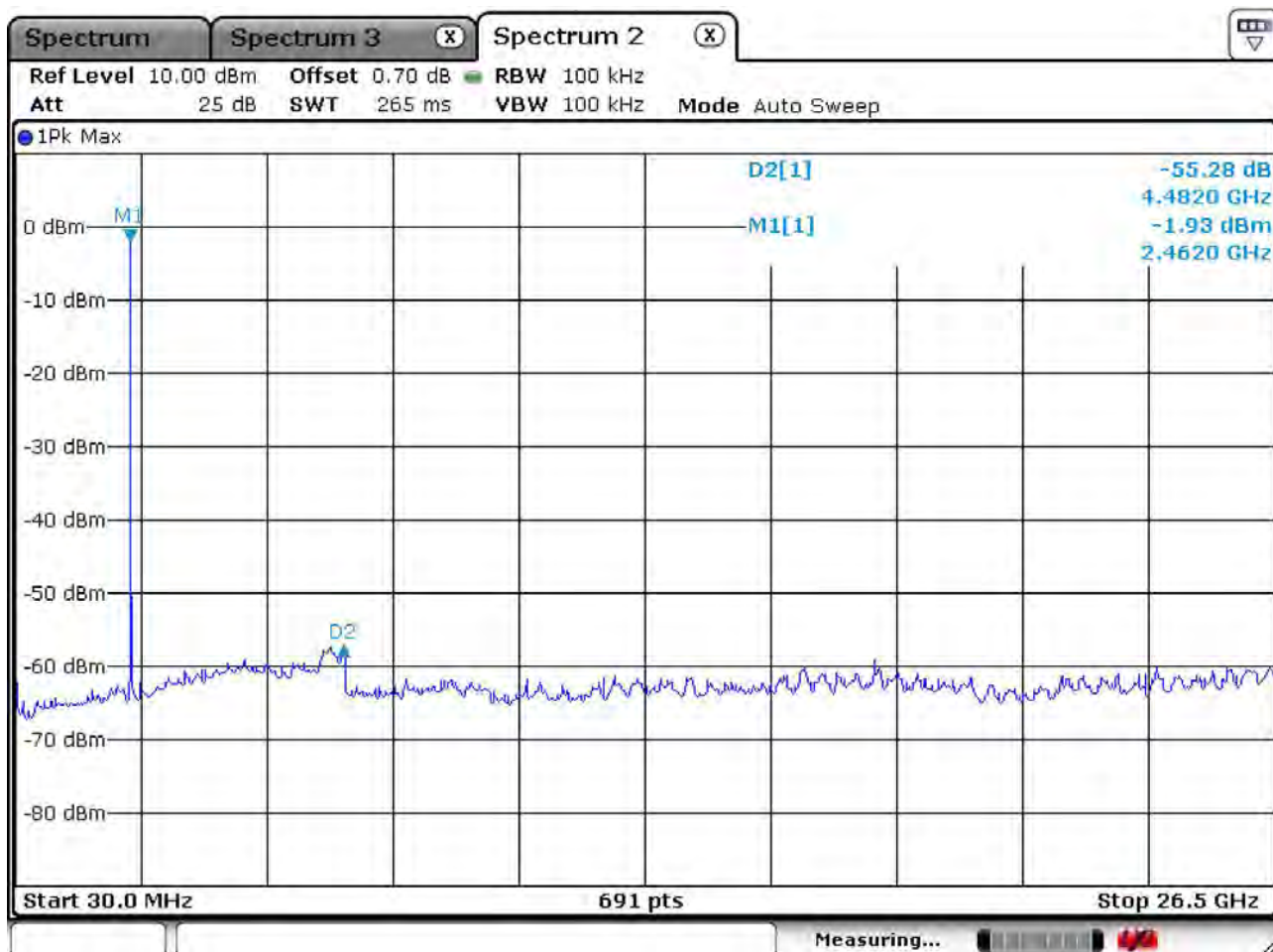
Unwanted Emission – Low channel
Frequency Range = 30 MHz ~ 26.5 GHz



Unwanted Emission – Middle channel
Frequency Range = 30 MHz ~ 26.5 GHz



Unwanted Emission – High channel
Frequency Range = 30 MHz ~ 26.5 GHz



3.2.7 Field Strength of Harmonics - Transmitter

Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10th harmonic.

RBW = 100 kHz (30MHz ~ 1 GHz)

= 1 MHz (1 GHz ~ 10th harmonic)

Span = 100 MHz

Trace = max hold

Peak:VBW \geq RBW

Average:VBW=10Hz

Detector function = Peak and Average

Sweep = auto

Measurement Data: Complies

→ Refer to the next page.

→ No other emissions were detected at a level greater than 20dB below limit.

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Measurement Data:

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor			Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
4804.00	44.5	51.0	H	31.4	36.5	5.7	54.0	74.0	45.2	51.7	8.8	22.3
4881.0	37.0	49.0	H	31.4	36.5	5.7	54.0	74.0	37.7	49.7	16.3	24.3
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor			Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp. Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
4960.0	35.2	46.6	H	31.4	36.5	5.7	54.0	74.0	35.9	47.3	18.1	26.7
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-

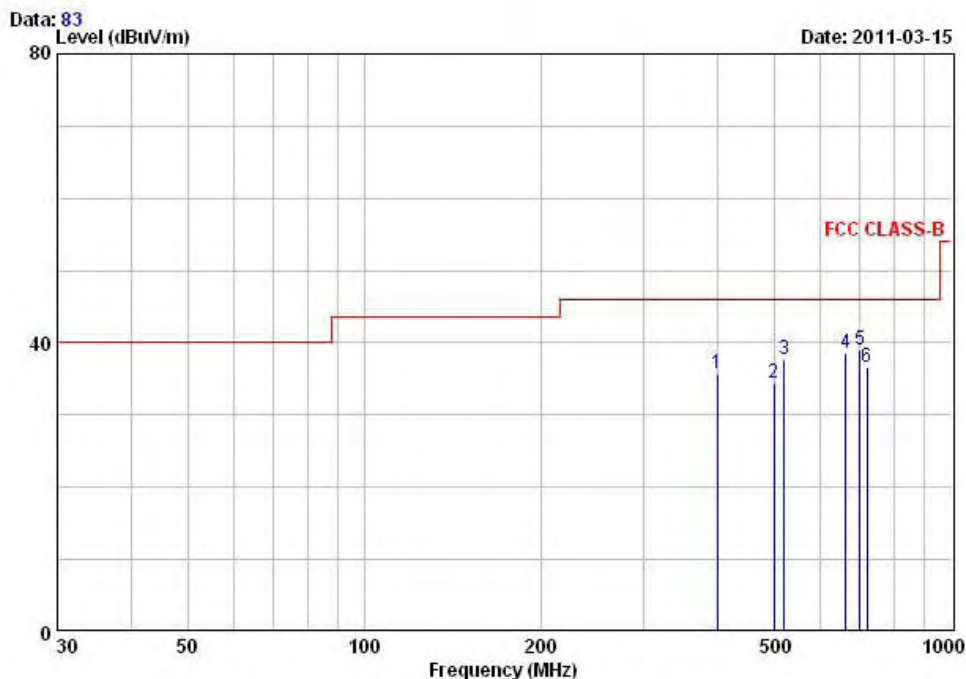
No other emissions were detected at a level greater than 20dB below limit.

Field strength at Active sync + BT + "H" mode



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EUT/Model No.: MC-7100S TEST MODE: Active sync+BT+"H" mode
Temp Humid : 7 / 25 Tested by: KIM.K.I



Peak	Freq (MHz)	Reading (dBuV/m)	C.F (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Angle (deg)	Polarity
1	400.00	41.20	-5.37	35.83	46.00	10.17	122	146	HORIZONTAL
2	500.00	37.60	-3.18	34.42	46.00	11.58	210	302	HORIZONTAL
3	520.21	40.30	-2.61	37.69	46.00	8.31	210	152	HORIZONTAL
4	662.20	37.50	0.99	38.49	46.00	7.51	100	213	VERTICAL
5	699.98	37.20	1.77	38.97	46.00	7.03	141	134	HORIZONTAL
6	720.00	34.60	2.07	36.67	46.00	9.33	142	261	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

3.2.8 Field Strength of Harmonics - Receivers

Definition:

The field strength of emissions from intentional radiators was measured. In case of the air temperature of the test site is out of the range is 10 to 40°C before the testing proceeds the warm-up time of EUT maintain adequately

Test method	: FCC Part 15.209
Frequency Range	: 30 MHz ~ 10 th harmonic.
Bandwidth	: 120 kHz (F < 1GHz) 1 MHz (F > 1GHz)
Distance of antenna	: 3 meters
Test mode	: Rx mode
Result	: Complies

Measurement Data:

- Refer to the next page.
- No other emissions were detected at a level greater than 20dB below limit
- It gave the worse case emissions.

Field Strength Limit

Part 15.209 LIMIT:

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100**
88 ~ 216	150**
216 ~ 960	200**
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Measurement Data:

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor			Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor			Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain	Cable	AV / Peak		AV / Peak		AV / Peak	
Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor			Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV / Peak			Antenna	Amp.Gain	Cable	AV / Peak		AV / Peak		AV / Peak	

No other emissions were detected at a level greater than 20dB below limit.

3.2.9 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: Complies

- See next pages for actual measured spectrum plots.
- No emissions were detected at a level greater than 10dB below limit.

Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

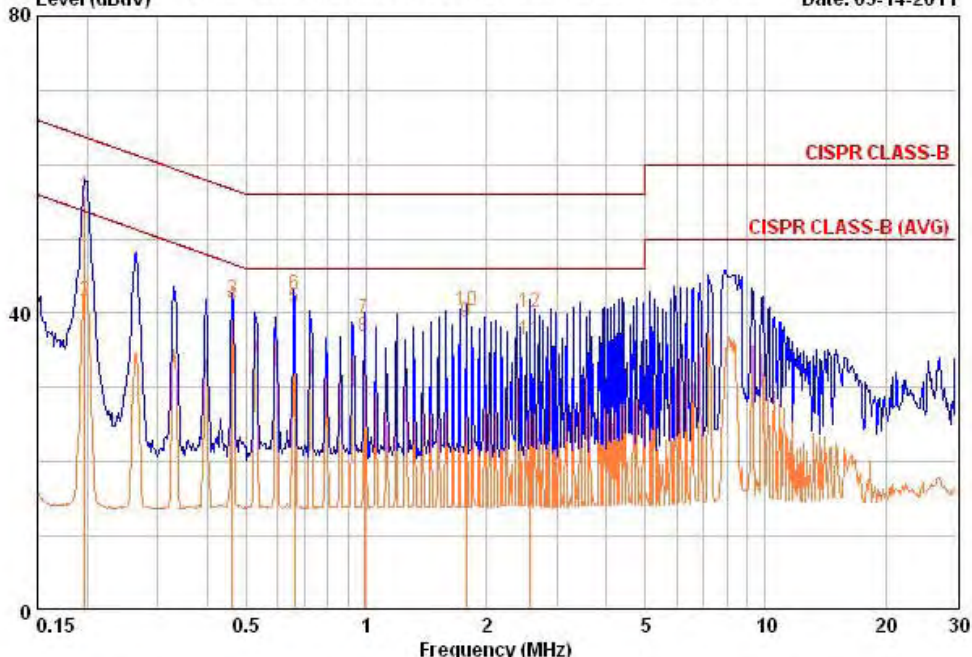
AC Conducted Emissions – Active sync + BT + “H” mode - Line



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Tel +82-31-3236008,9
Fax:+82-31-3236010

EUT / Model No. : MC-7100S Phase : LINE
 Test Mode : Active sync+BT+“H” mode Test Power : 120 / 60
 Temp./Humi. : 22 / 51 Test Engineer : KIM.K.I

Data: 332 File: C:\Conducted Data\2011\LTA_Conduction_1103-1.EMI (360) Date: 03-14-2011



Freq MHz	RD		C.F	Result		Limit		Margin	
	QP dBuV	AV dBuV		QP dBuV	AV dBuV	QP dBuV	AV dBuV	QP dB	AV dB
0.197	46.16	32.06	9.64	55.80	41.70	63.74	53.74	7.94	12.04
0.462	32.25	31.25	9.67	41.92	40.92	56.66	46.66	14.74	5.74
0.660	32.76	31.16	9.66	42.42	40.82	56.00	46.00	13.58	5.18
0.990	29.46	27.26	9.67	39.13	36.93	56.00	46.00	16.87	9.07
1.783	30.71	29.21	9.68	40.40	38.90	56.00	46.00	15.60	7.10
2.576	30.47	26.67	9.69	40.16	36.36	56.00	46.00	15.84	9.64

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

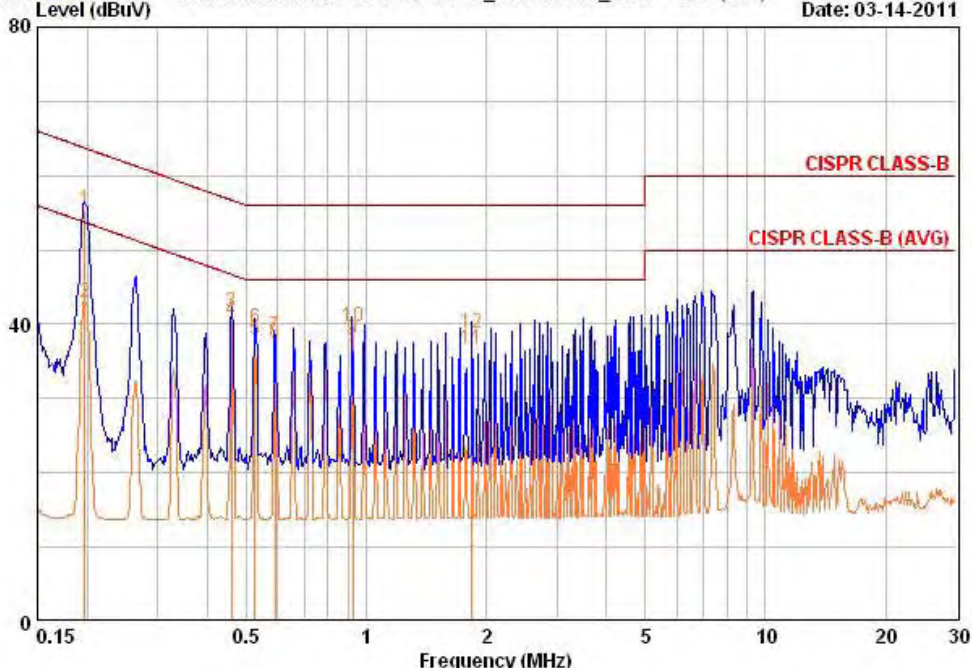
AC Conducted Emissions – Active sync + BT + “H” mode - Neutral



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EUT / Model No. : MC-7100S Phase : NEUTRAL
 Test Mode : Active sync+BT+“H” mode Test Power : 120 / 60
 Temp./Humid. : 22 / 51 Test Engineer : KIM.K.I

Data: 334 File: C:\Conducted Data\2011\LTA_Conduction_1103-1.EMI (360) Date: 03-14-2011



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.197	45.66	33.36	9.64	55.30	43.00	63.74	53.74	8.44	10.74
0.460	32.05	30.85	9.66	41.71	40.51	56.69	46.69	14.98	6.18
0.526	29.85	28.25	9.67	39.52	37.92	56.00	46.00	16.48	8.08
0.591	28.65	27.75	9.67	38.32	37.42	56.00	46.00	17.68	8.58
0.924	29.96	28.26	9.67	39.63	37.93	56.00	46.00	16.37	8.07
1.842	29.22	26.92	9.68	38.90	36.60	56.00	46.00	17.10	9.40

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Interval	Last Cal. Date
1	Spectrum Analyzer (~30GHz)	FSV-30	100757	R&S	1 year	2011-01-24
2	Spectrum Analyzer (~2.9GHz)	8594E	3710A04074	HP	2 year	2009-10-12
3	Signal Generator (~3.2GHz)	8648C	3623A02597	HP	1 year	2011-03-30
4	Signal Generator (1~20GHz)	83711B	US34490456	HP	1 year	2011-03-30
5	Attenuator (3dB)	8491A	37822	HP	2 year	2010-10-08
6	Attenuator (10dB)	8491A	63196	HP	2 year	2010-10-08
7	Attenuator (30dB)	8498A	3318A10929	HP	2 year	2011-01-05
8	Test Receiver (~30MHz)	ESHS10	828404/009	R&S	1 year	2011-03-30
9	EMI Test Receiver (~1GHz)	ESCI7	100722	R&S	1 year	2010-10-08
10	RF Amplifier (~1.3GHz)	8447D	2439A09058	HP	2 year	2010-10-08
11	RF Amplifier (1~18GHz)	8449B	3008A02126	HP	2 year	2010-03-29
12	Horn Antenna (1~18GHz)	BBHA 9120D	9120D122	SCHWARZBECK	2 year	2010-12-24
13	Horn Antenna (18 ~ 40GHz)	SAS-574	154	Schwarzbeck	2 year	2010-11-25
14	Horn Antenna (18 ~ 40GHz)	SAS-574	155	Schwarzbeck	2 year	2010-11-25
15	TRILOG Antenna	VULB 9160	9160-3172	SCHWARZBECK	2 year	2010-10-07
16	Dipole Antenna	VHA9103	2116	SCHWARZBECK	2 year	2010-11-25
17	Dipole Antenna	VHA9103	2117	SCHWARZBECK	2 year	2010-11-25
18	Dipole Antenna	VHA9105	2261	SCHWARZBECK	2 year	2010-11-25
19	Dipole Antenna	VHA9105	2262	SCHWARZBECK	2 year	2010-11-25
20	Hygro-Thermograph	THB-36	0041557-01	ISUZU	2 year	2010-04-12
21	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-	-
22	Power Divider	11636A	6243	HP	2 year	2010-10-08
23	DC Power Supply	6622A	3448A03079	HP	-	-
24	Frequency Counter	5342A	2826A12411	HP	1 year	2011-03-30
25	Power Meter	EPM-441A	GB32481702	HP	1 year	2011-03-30
26	Power Sensor	8481A	US41030291	HP	1 year	2010-10-08
27	Audio Analyzer	8903B	3729A18901	HP	1 year	2010-10-08
28	Modulation Analyzer	8901B	3749A05878	HP	1 year	2010-10-08
29	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	1 year	2010-10-08
30	Stop Watch	HS-3	601Q09R	CASIO	2 year	2010-03-31
31	LISN	ENV216	100408	R&S	1 year	2010-10-08
32	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	106243	R&S	2 year	2010-05-13
33	Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	-	-
34	Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	-	-